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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Frans Lodewijk Plantenga

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ALBEMARLE CORPORATION
PATENT DEPARTMENT
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EXAMINER

SINGH, PREM C

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/730,433	Applicant(s) PLANTENGA ET AL.	
	Examiner PREM C. SINGH	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/11/2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer (US Patent 6,086,749) ("Kramer") in view of Schindler (US Patent 4,414,141) ("Schindler").

4. With respect to claims 1 and 3, Kramer discloses a process for the hydroconversion of a hydrocarbon feed in the presence of a catalyst mixture of two catalysts, each containing Groups VI B and VIII metals on a porous inorganic support where at least 75% of the total pore volume are in pores of between about 20 to about 30 nm and less than 10% of the total pore volume is in pores within the range of 0 to 10 nm, the catalyst having a surface area typically from about 50 to about 300 m²/g and a pore volume ranging from about 0.8 to about 3.0 cc/g and Kramer discloses that the difference between the densities in the first and second catalyst can

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be +/-10 wt% (See claim 1; column 32, lines 25-29, 66-67; column 33, lines 1-6, 9-10, 12-32; column 38, lines 23-28).

Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

Kramer does not appear to specifically disclose that the second catalyst has at least 5% of the pore volume in pores with a diameter of at least 100 nm.

Schindler discloses a catalyst for hydrotreating of heavy feedstocks similar to Kramer (See abstract). Schindler also discloses that the catalyst has 0.25 cc/g out of 1.20 cc/g in pores with a diameter greater than 150 nm (See column 1, Table). Schindler further discloses that such a catalyst has improved hydrotreating activity and improved catalyst life (See column 1, lines 33-35).

In view of similarity of the catalysts disclosed by Kramer and Schindler, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kramer to include a catalyst that has 0.25 cc/g out of 1.20 cc/g in pores with a diameter greater than 150 nm in order to improve hydrotreating activity and catalyst life.

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Also, it is expected that the first catalyst would inhibit sediment formation and promote asphaltene removal and the second catalyst will provide catalytic activity and inhibit sediment formation, as claimed, because the catalysts taught by Kramer and Schindler are similar to the Applicant's claimed catalysts, and also because such characteristics would flow naturally from the prior art catalyst disclosed (see MPEP 2145 I1., citing *Ex parte Obiaya*).

5. With respect to claim 2, Kramer discloses that the catalyst base may be alumina (See column 29, lines 17-18).

6. With respect to claim 4, Kramer discloses that the catalysts comprise about 5 to about 50 wt% of molybdenum oxide and about 1 to about 12 wt% of nickel or cobalt oxide (See column 32, lines 16-24).

7. With respect to claim 6, Kramer, discloses that the catalyst bed is an ebullated bed configuration (See column 23, lines 6-13).

8. With respect to claims 7 and 9, Kramer discloses a catalyst mixture of two catalysts that each contain Groups VIB and VIII metals on a porous inorganic support,

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where at least 75% of the total pore volume are in pores of between about 20 to about 30 nm, and less than 10% of the total pore volume is in pores within the range of 0 to 10 nm, the catalyst having a surface area ranging typically from about 50 to about 300 m²/g and a pore volume ranging from about 0.8 to about 3.0 cc/g, and the difference between the densities in the first and second catalyst of +/-10 wt% (See claim 1; column 32, lines 25-29, 66-67; column 33, lines 1-6, 9-10, 12-32; column 38, lines 23-28).

Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

Kramer does not appear to specifically disclose that the second catalyst has at least 5% of the pore volume in pores with a diameter of at least 100 nm.

Schindler discloses a catalyst for hydrotreating of heavy feedstocks similar to Kramer (See abstract). Schindler also discloses that the catalyst has 0.25 cc/g out of 1.20 cc/g in pores with a diameter greater than 150 nm (See column 1, Table). Schindler also discloses that such a catalyst has improved hydrotreating activity and improved catalyst life (see Schindler, column 1, lines 33-35).

In view of similarity of the catalysts disclosed by Kramer and Schindler, it would have been obvious to one having ordinary skill in the art at the time of the invention to

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modify the catalysts of Kramer to include a catalyst that has 0.25 cc/g out of 1.20 cc/g in pores with a diameter greater than 150 nm in order to improve hydrotreating activity and catalyst life.

Also, it is expected that the first catalyst would inhibit sediment formation and promote asphaltene removal and the second catalyst will provide catalytic activity and inhibit sediment formation, as claimed, because the catalysts taught by Kramer and Schindler are similar to the Applicant's claimed catalysts, and also because such characteristics would flow naturally from the prior art catalyst disclosed (see MPEP 2145 I1., citing *Ex parte Obiaya*).

9. With respect to claim 8, Kramer discloses that the catalyst base may be alumina (See column 29, lines 17-18).

10. With respect to claim 10, Kramer discloses that the catalysts comprise about 5 to about 50 wt% of molybdenum oxide and about 1 to about 12 wt% of nickel or cobalt oxide (See column 32, lines 16-24).

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer in view of Schindler as applied to claim 1 above, and further in view of Riley (US Patent 4,069,139) ("Riley").

Kramer discloses that the feed is a heavy hydrocarbon that has at least 50 % boiling above about 510 degrees C (See column 25, lines 4-9), but Kramer does not appear to specifically disclose that the feed comprises at least 2 wt% sulfur and at least 5 wt% of Conradson carbon.

Riley discloses a hydrodesulfurization process using feed, catalyst and operating conditions similar to Kramer (See column 1, lines 60-67; column 2, lines 1-13; column 3, lines 50-63). Riley also discloses that heavy hydrocarbon feed contains 8 wt% of sulfur and a Conradson carbon content of from about 5 to about 50 wt% (See column 3, lines 20-38). Riley further discloses that heavy hydrocarbon feeds usually contain large amounts of sulfur and a Conradson carbon content of from about 5 to about 50 wt% (See column 3, lines 31-38).

In view of Riley's disclosure, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kramer in view of Schindler to include a heavy hydrocarbon feed that contains 8 wt% of sulfur and a Conradson carbon content of from about 5 to about 50 wt% because as per Riley, such amounts of sulfur and Conradson carbon are usually found in heavy hydrocarbons.

Response to Arguments

12. Applicant's arguments filed 09/11/2009 have been fully considered but they are not persuasive.

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13. In the arguments on page 5-6, the Applicant argues that Kramer requires BET surface area of both catalysts to be at least $200 \text{ m}^2/\text{gm}$. Schindler discloses that the catalyst used therein can have a BET of “.....at least $125 \text{ m}^2/\text{gm}$ and most generally from $150\text{-}300 \text{ m}^2/\text{gm}$...” Thus, the combination of Kramer and Schindler is not proper.

The Applicant's argument is not persuasive because Kramer discloses a surface area of the catalysts typically in the range of about 50 to $300 \text{ m}^2/\text{gm}$ (See column 38, lines 23-28; column 41, lines 34-36; column 45, lines 66-67). With Schindler's disclosure of catalyst surface area in the range of $150\text{-}300 \text{ m}^2/\text{gm}$ (See column 1, lines 56-57), it would have been obvious to one with ordinary skill in the art to combine Kramer's and Schindler's teaching because both are teaching identical catalysts.

14. In the arguments on page 6, the Applicant argues that neither Kramer, Schindler, nor the combination of Kramer and Schindler, includes a teaching, motivation, or suggestion that the first catalyst has a larger percentage of its pore volume with a diameter of at least 20 nm.

The Applicant's argument is not persuasive because Kramer discloses that the catalyst has about 50%, preferably about 75%, of its total pore volume in the range of about 200 to 300 Å (20-30 nm) (See column 33, lines 1-4). Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference

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between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

15. In the arguments on page 6-7, the Applicant argues that claims 2-4 and 6 have limitations of claim 1 and therefore, not obvious over Kramer.

The Applicant's argument is not persuasive because as discussed in the Office action above, claim 1 is obvious over Kramer in view of Schindler, and therefore, claims 2-4 and 6 are also obvious.

16. In the arguments on page 7-9, the Applicant argues that claims 7 and 9 are not obvious because Kramer requires that BET of both catalysts be at least 200 m²/gm. Schindler discloses that the catalyst used therein can have a BET of ".....at least 125 m²/gm and most generally from 150-300 m²/gm..." Thus, the combination of Kramer and Schindler is not proper.

The Applicant's argument is not persuasive because Kramer discloses a surface area of the catalysts typically in the range of about 50 to 300 m²/gm (See column 38, lines 23-28; column 41, lines 34-36; column 45, lines 66-67). With Schindler's disclosure of catalyst surface area in the range of 150-300 m²/gm (See column 1, lines 56-57), it would have been obvious to one with ordinary skill in the art to combine Kramer's and Schindler's teaching because both are teaching identical catalysts.

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17. In the arguments on page 9, the Applicant argues that neither Kramer, Schindler, nor the combination of Kramer and Schindler includes a teaching, motivation, or suggestion that the first catalyst has a larger percentage of its pore volume in pores with a diameter of at least 20 nm (200 Å) than the second catalyst.

The Applicant's argument is not persuasive because Kramer discloses that the catalyst has about 50%, preferably about 75%, of its total pore volume in the range of about 200 to 300 Å (20-30 nm) (See column 33, lines 1-4). Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

18. In the arguments on page 9-10, the Applicant argues that claims 8 and 10 are not obvious because the independent claim 7 is not obvious.

The Applicant's argument is not persuasive because as discussed in the Office action above, claim 7 is obvious over Kramer in view of Schindler, and therefore, claims 8 and 10 are obvious.

19. In the arguments on page 10, the Applicant argues that claim 5 is not obvious over Kramer in view of Schindler and further in view of Riley because independent claim 1 is not obvious.

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The Applicant's argument is not persuasive because as discussed in the Office action above, claim 1 is obvious over Kramer in view of Schindler, and therefore, claim 5 is obvious over Kramer in view of Schindler and further in view of Riley.

20. In conclusion, the claimed invention is *prima facie* obvious over Kramer in view of Schindler and further in view of Riley.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PREM C SINGH/
Examiner, Art Unit 1797